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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/583,033	06/15/2006	Hideki Yoshikawa	520.46263X00	6757
20457 7590 06/09/2010 ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873				
EXAMINER				
BRUTUS, JOEL F				
ART UNIT		PAPER NUMBER		
3768				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/583,033

**Applicant(s)**

YOSHIKAWA ET AL.

**Examiner**

JOEL F. BRUTUS

**Art Unit**

3768

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 May 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6, 8-10 and 18-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 6, 8-10 and 18-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/10/2010 has been entered.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 19-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is not clear when a correlation is "mutual" and it is also unclear how the motion of the projected component is produced if the motion is lower than a predetermined value.

It appears that the motion is produced with calculating a mutual correlation function between a base frame and a next frame regardless the predetermined value.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-6, 8 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hossack et al (US Pat: 6,045,508) in view of Otsuka et al (US Pat: 6,263,089).

Regarding claim 1, Hossack et al teach an ultrasonic probe, system and method for acquiring two dimensional image information and relative positional information to allow subsequent three dimensional reconstructions utilizing an ultrasonic probe that has at least two ultrasonic transducer arrays [see field of invention that is pertinent to the claimed invention. Hossack et al teach the ultrasound transducers are constructed of piezoelectric material [see column 4 lines 50-60]. As well known in the art, first and second transducer arrays transmit ultrasonic waves to an object and acquire reflection signals from the object (emphasis added).

Hossack et al teach first ultrasound array 20 to acquire first two dimensional image data in an image plane and second ultrasound array 22 to acquire second two dimensional image data referred in the reference as "tracking data" [see column 3 lines 52-65 and column 2 lines 17-25]. Hossack et al disclose one of the arrays is used as

image array and tracking array, multiple two dimensional image data are accumulated and assembled into a three dimensional volume [see column 5 lines 12-45] and further mention figs 1-3 can be used to reconstruct three dimensional images [see column 5 lines 7-8].

Hossack et al teach a motion estimator 138 [see fig 4 and 6] which receives images data from both transducer arrays, that is capable of estimating/detecting a three dimensional motion of the object from the reflection signals (emphasis added and see column 7 lines 10-35).

Hossack et al teach images data from both transducer arrays are simultaneously displayed in a split screen [see column 6 lines 30-45]; Computer 136 can select three dimensional information to be displayed on display 146 [see column 7 lines 28-33].

Hossack et al don't specifically mention producing velocity components of the three dimensional motion.

However, Hossack et al suggest using Doppler energy which is well known in the art to detect velocity components.

Nevertheless, Otsuka et al teach determining velocity components of three dimensional motion of an object [see column 9 lines 1-30].

Therefore, one with ordinary skill in the art at the time the invention was made would be motivated to combine Hossack et al with Otsuka et al by determining or producing velocity components of three dimensional motion of an object for analysis purposes.

Regarding claim 18, all other limitations are taught as set forth by the above teaching.

Hossack et al teach the arrays can acquire image data simultaneously or sequentially [see column 5 lines 10-20 and 53-60]. If simultaneous operation mode is used; due to the non parallel configurations of the scanning surfaces of the two transducer arrays 20 and 22 as shown in fig 1, the ultrasonic waves from the two transducer arrays would cross over each other [see fig 1]. Since the arrays can operate sequentially, first and second transducer arrays; the first and second two dimensional images are acquired in sequential frames (emphasis added).

Hossack et al don't teach detecting velocity components.

However, Otsuka et al teach determining velocity components of three dimensional motion of an object [see column 9 lines 1-30].

Therefore, one with ordinary skill in the art at the time the invention was made would be motivated to combine Hossack et al with Otsuka et al by determining or producing velocity components of three dimensional motion of an object for analysis purposes.

Regarding claim 2, Hossack et al teach in fig 1 the scanning surfaces array 22 and array 20 are not in parallel to each other [see fig 1]. Hossack et al further teach acquiring images in a image plane non zero angle to the image plane of the second transducer array [see column 2 lines 18-20].

Regarding claim 3, Hossack et al teach images data (biplane images, emphasis added) from both transducer arrays are simultaneously displayed in a split screen [see column 6 lines 30-45]. Hossack et al teach the arrays can acquire image data simultaneously or sequentially [see column 5 lines 10-20 and 53-60].

Regarding claims 5 and 8, Hossack et al teach in figs 15-16, displays indicating movement or motion; where the cross section is changed [see figs 15-16].

Regarding claim 6, all other limitations are taught as set forth by the above teaching.

Hossack et al don't teach a correlation function of a plurality of one-dimensional signals.

However, Hossack et al teach two and three dimensional [see above].

Therefore, one with ordinary skill in the art at the time the invention was made would have been motivated to use one-dimensional because it's cost effective.

Regarding claims 4, 19-20, all other limitations are taught as set forth by the above teaching.

Hossack et al don't teach if motion is lower than a predetermined value; produce a motion with calculating a mutual correlation.

Applicant describes a mutual correlation function as suppressing or extracting a contour or speckle component to indirectly estimate motion [see 0067, specification].

However, Hossack et al teach a motion estimator 138 that compares sequences of frames to estimate a component of motion [see column 7 lines 1-10] and supplied the estimated motion to a calculator that calculates a value defining the best estimate of movement between frames [see column 7 lines 10-20]. Hossack et al teach in figs 15-16, displays indicating movement or motion.

Nevertheless, Otsuka et al teach contour or edge is used to acquire motion [see column 7 lines 10-15 and abstract].

Therefore, one with ordinary skill in the art at the time the invention was made would have been motivated to compare the motion value to a predetermined value and to combine Hossack et al with Otsuka et al by using contour or edge to calculate motion; for accuracy purposes.

6. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hossack et al (US Pat: 6,045,508) in view of Otsuka et al (US Pat: 6,263,089) as applied to claim 1 above and further in view of Coleman et al (US Pat: 4,932,414).

Regarding claims 9-10, all other limitations are taught as set forth by the above combination.

Hossack et al don't teach an ultrasonic therapeutic device.

However, Coleman et al teach diagnostic ultrasonic system with a therapeutic ultrasonic system and diagnostic portion of the system provides three- dimensional and/or cross-sectional images of the tissue under scrutiny in real- time [see column 3 lines 2-7].



Therefore, one with ordinary skill in the art at the time the invention was made would have been motivated to combine Hossack et al with Coleman et al by using the therapeutic transducer assembly and the diagnostic transducer and the teaching of a display format that superimpose on a B-mode image [see column 3 lines 62-64] as taught by Coleman; for the purpose of better diagnosing the region of interest to provide an accurate evaluation as to prescribe the best possible treatment.

### ***Response to Arguments***

7. Applicant's arguments with respect to claims 1-6, 8-10 and 17-18 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL F. BRUTUS whose telephone number is (571)270-3847. The examiner can normally be reached on Mon-Fri 7:30 AM to 5:00 PM (Off alternative Fri).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on (571)272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. F. B./  
Examiner, Art Unit 3768

/Long V Le/  
Supervisory Patent Examiner, Art Unit 3768